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β-glucans and immunity: a new paradigm in metabolic syndrome

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The innate immune system responds in a rapid and nonspecific manner against immunologic threats. Inflammation is part of this response. This is followed by a slower but targeted and specific response known as adaptive or acquired immune response. There is emerging evidence that polysaccharides such as Saccharomyces-derived carbohydrates can aid host defense against pathogens by modulating inflammatory and antimicrobial activity of neutrophils and macrophages. Trained immunity refers to a newly recognized phenomenon wherein compounds may "train" immune cells. Under the umbrella of trained immunity, a broad protection can be achieved by: (i) increasing the nonspecific effector response of innate immune cells (e.g., monocyte/macrophages) to pathogens, (ii) harnessing the activation state of dendritic cells to enhance adaptive T cell responses to both specific and nonrelated (bystander) antigens. This capacity to promote responses beyond their nominal antigens may be particularly useful when conventional vaccines are not available or when multiple coinfections and/or recurrent infections arise in susceptible individuals. Besides the therapeutical β-Glucans subcutaneous evidences in URTI's and RUTI's, oral administration of β-Glucans evidences demonstrate immunological benefits for obesity and metabolic syndrome patients during treatment protocols. Obese and metabolic subjects has higher laboratorial parameters such as: fasting glucose, insulin, Free Fat Acids, total and LDL cholesterol, Triglycerides, C Reactive Protein (CRP), serum leptin, IL-6, sgp130, IL-18. Also lower insulin sensitivity, HDL-cholesterol, and serum adiponectin in comparison to normal-weight subjects.

Recent evidences discuss the efficacy of β-Glucans in metabolic subjects by altering the gut microbiota in individuals with obesity and metabolic syndrome. In altering gut microbiota, β-glucan increased the species richness, reversed the populations of 7 bacterial genera and increased butyrate producers including Ruminococcaceae and Lachnospiraceae which enhance gut barrier protection and regulate glucose homeostasis. This leads to reduction of inflammation and benefits on laboratorial parameters. The aim of this observation study is to determine whether these evidences are supported with the subcutaneous trained immunity β-Glucan protocol in subjects with metabolic syndrome. Herein, we report the results of a retrospective 2-year follow-up analysis aimed at establishing whether differences in treatment with β-Glucan protocol have been addressed and maintained and assessing their effects on inflammatory laboratorial parameters. This retrospective study evaluated 60 patients treated at the Nutrindo Ideais Performance and Nutrition Research Centre between January 1, 2018 and December 31, 2020. The patients were divided into two groups: the Group 1, composed of 30 patients who had the use of injected β-Glucan once in a month, and Group 2, composed of 30 patients without β-Glucan who followed the same treatment for metabolic syndrome. Outcomes show reductions on the Group 1 in the analyses of insulin, C Reactive Protein (CRP), serum leptin and IL-6 comparing with Group 2($p<0,05$). The analysis of laboratorial parameters in the studied population provides a greater understanding of the importance of β-Glucan in metabolic syndrome. Future studies are necessary to evaluate the benefits of this treatment in the reduction of cardiovascular risk, especially in patients with obesity and metabolic syndrome.

Speaker Biography

Guilherme Renke is a physician with Specialist title in Endocrinology and Metabology from the Brazilian Society of Endocrinology and Metabology (SBEM), Specialist title in Sports Medicine from the Brazilian Society of Exercise and Sports Medicine (SBMEE), postgraduate in cardiology from the National Institute of Cardiology from Rio de Janeiro (INCL), Improvement in Endocrinology by Harvard Medical School, Post graduate course obesity medicine (Boston, USA) and by the American Board of Obesity Medicine (USA).

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